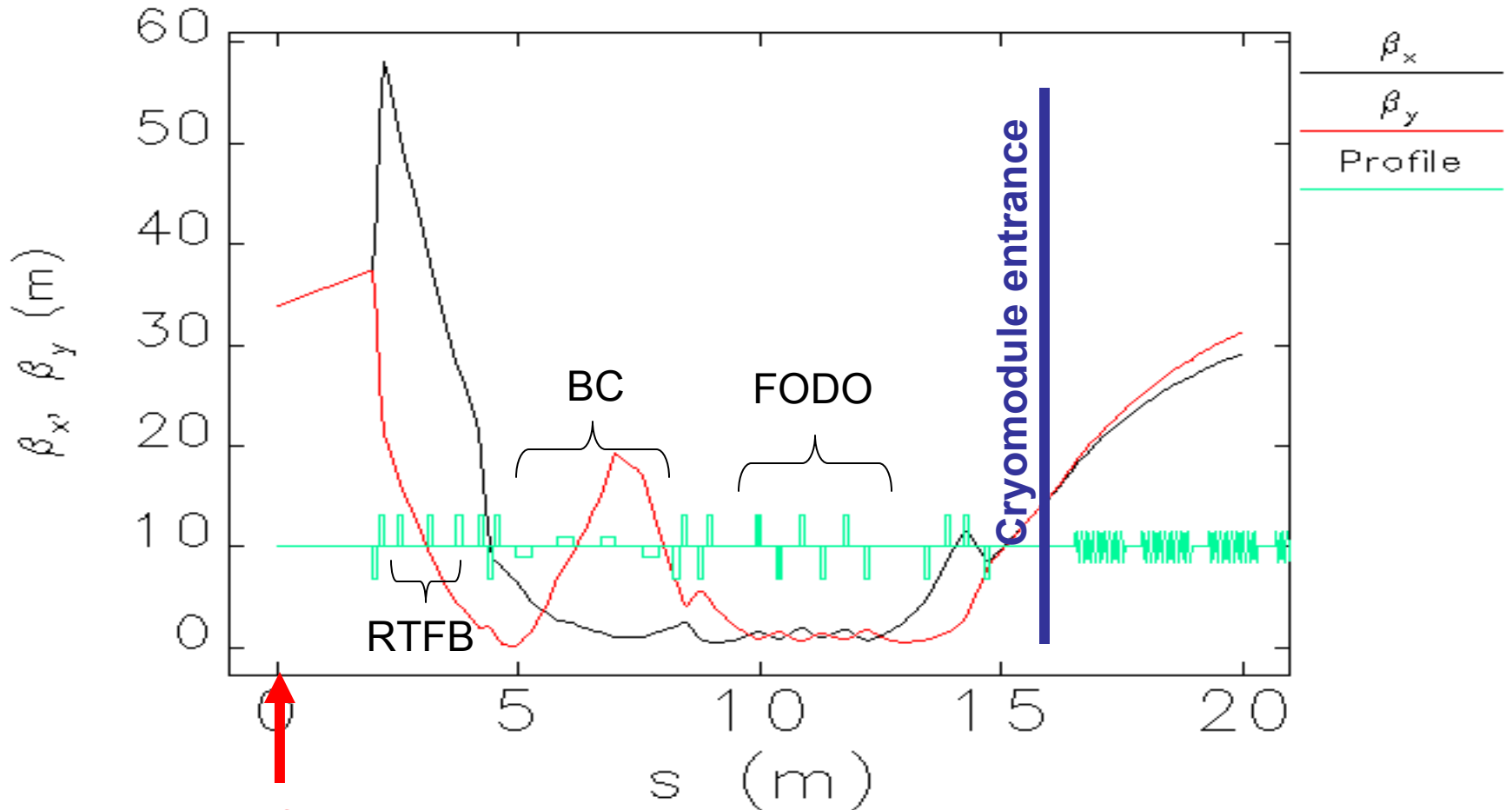

Injector for NML: design Status

Philippe Piot

Nov. 14th, 2007

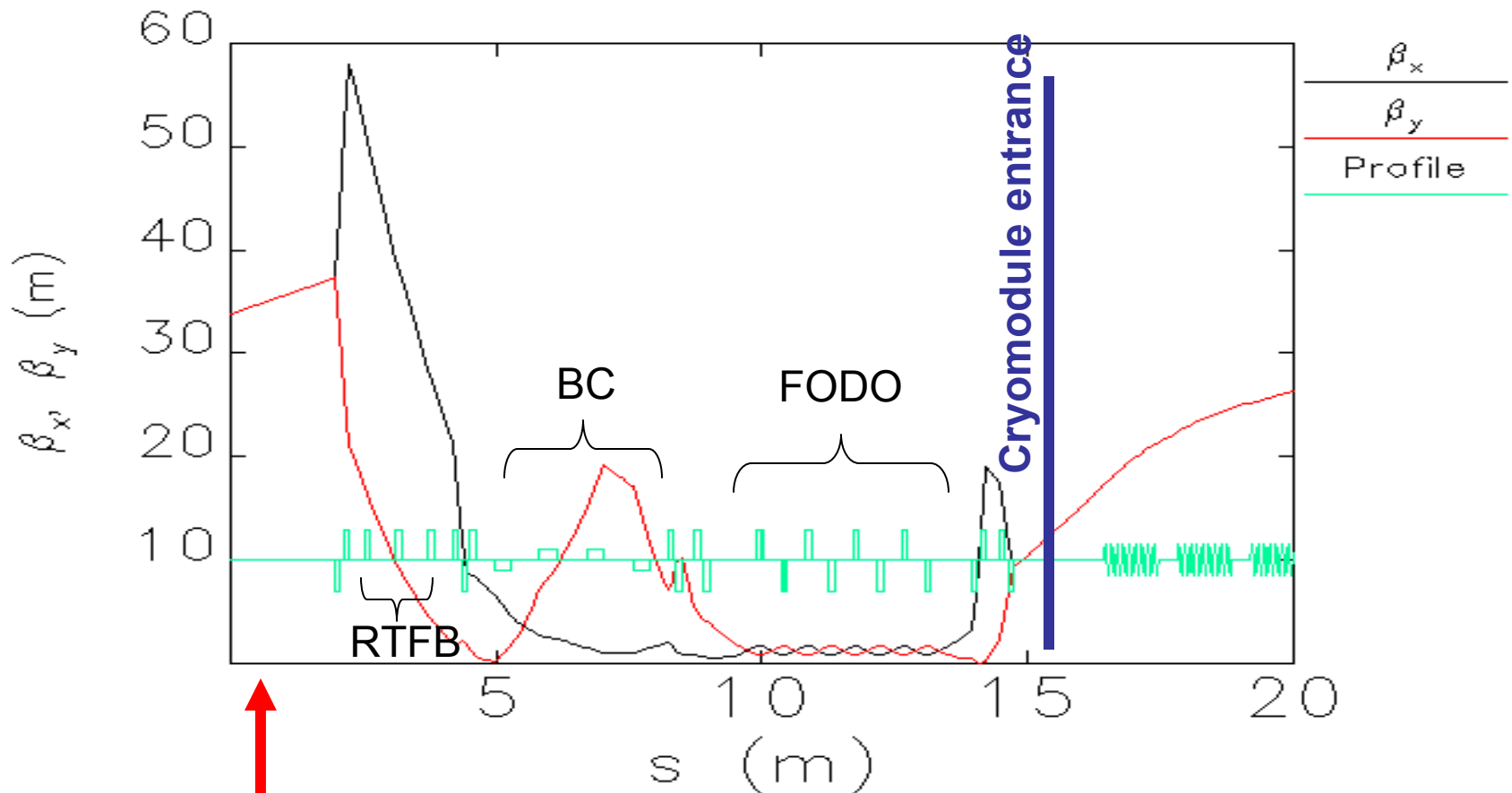
Lattice functions – 0-nC (6 quads FODO)



7 m from
cathode

RTFB= round-to-flat beam transform

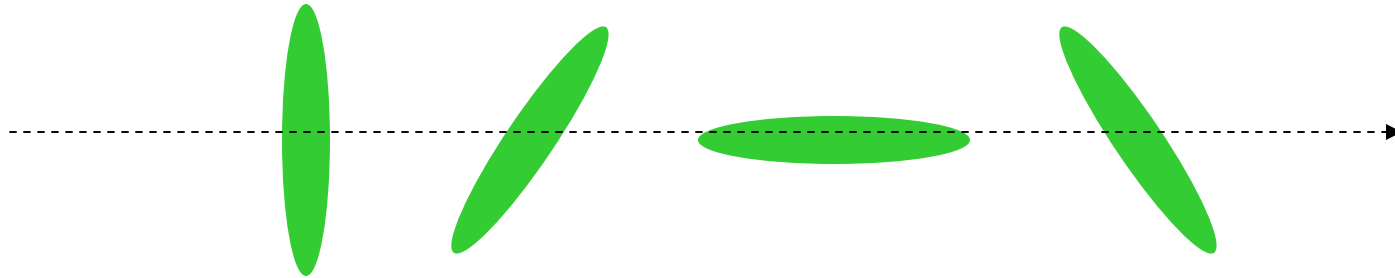
Lattice functions – 0-nC (8 quads FODO)



7 m from
cathode

Note on FODO channel

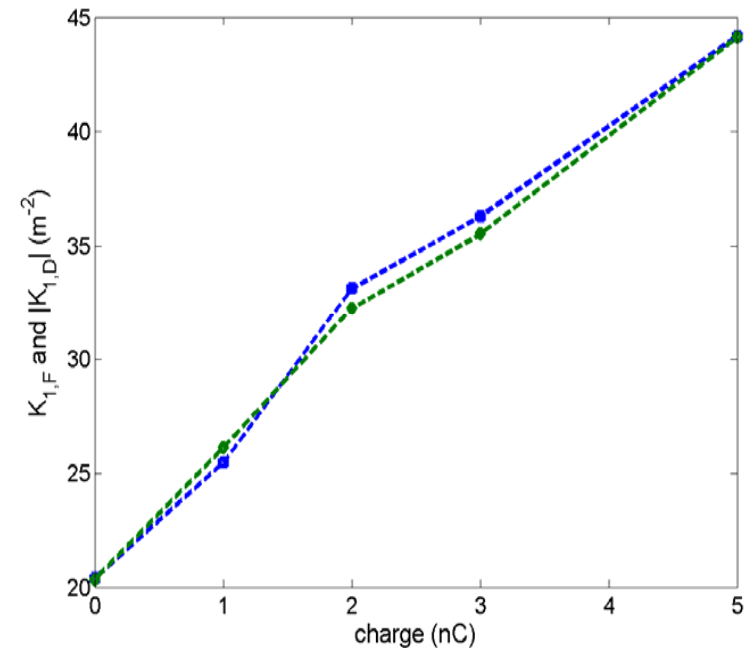
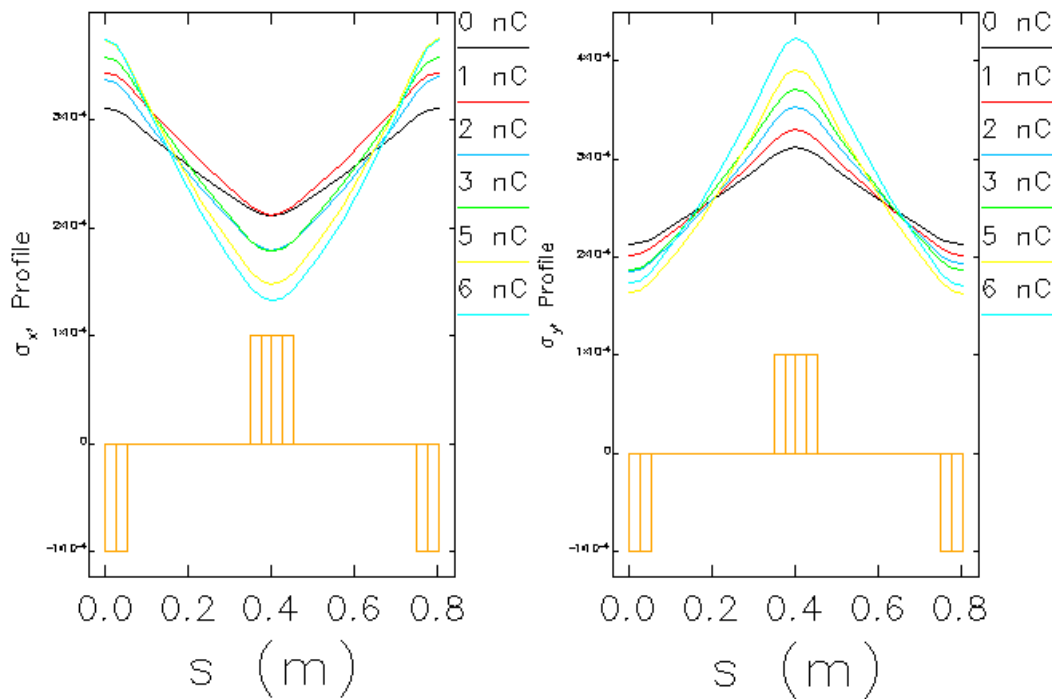
- Many possible combination:
 - 4 points w 45 deg/cell gives 1 redundant point (could also do 4 points w 36 deg/cell)



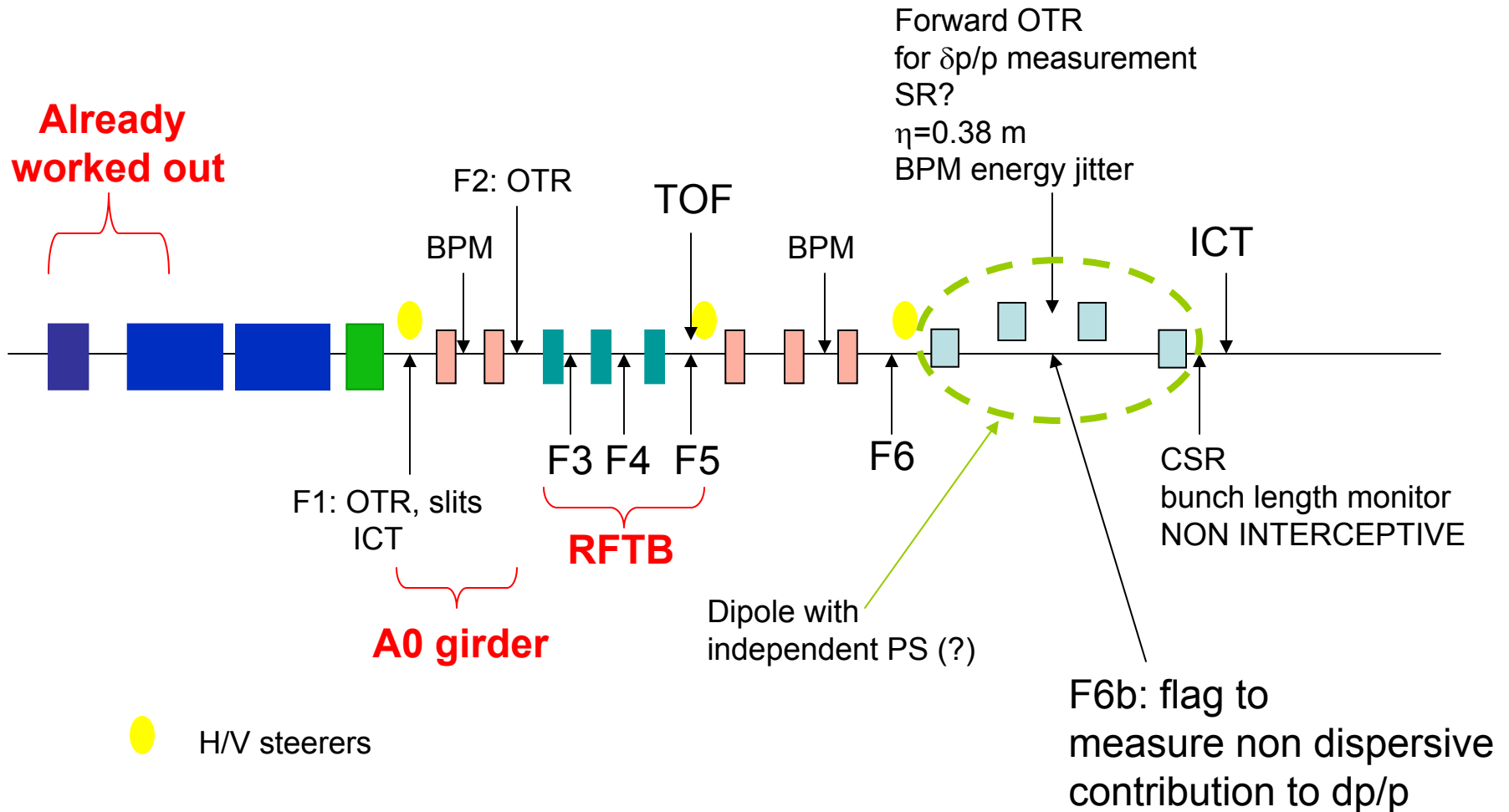
- 3 points w 60 deg phase advance (LEUTL) [minimum required]
- If we have 8 quads; this is 5 measurements with
 - 36 deg cell (one redundant measurement)
 - 30 deg cell (minimum)

(Linear) Space charge effects in FODO

- Matching harder as charge is increased
- Measuring emittance in two planes with good accuracy will (most probably) require two sets of matching (for each plane).



Diagnostics: upstream compressor



Quad choice

Strength ($=$ spring constant) $\rightarrow |k_1| \approx \frac{e\beta c}{\gamma mc^2} \partial_x B_y \approx 6 \partial_x B_y [T/m]$

velocity $\rightarrow \beta$

Lorentz factor $\rightarrow \gamma$

Field gradient $\rightarrow \partial_x B_y$

For **50 MeV/c** beam

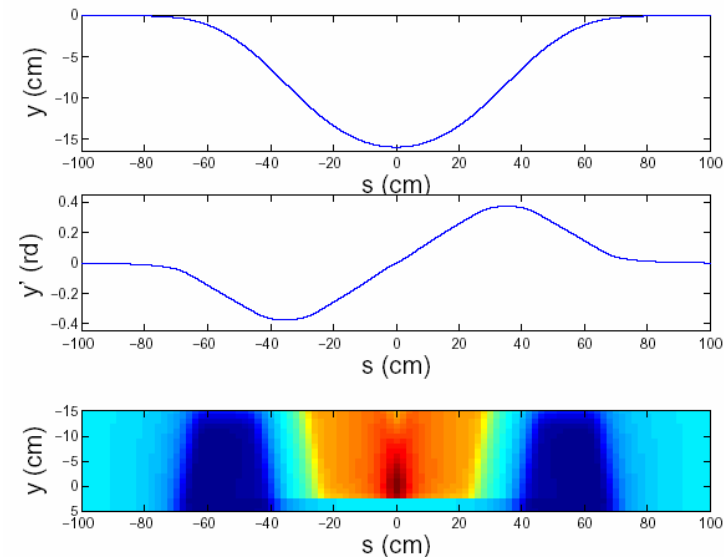
	A0 magnet? EMQ-O200-01	Radiabeam EMQ-O200-02
Physical Properties		
Physical yoke length	8.6 cm	8.0 cm
Physical length including coils	9.6 cm	15.0 cm
Transverse footprint	24.0 cm	30.0 cm
Weight	21 kg	34 kg
Magnetic Properties		
Magnetic length	10.8 cm	11.3 cm
99% field cut-off length	19.3 cm	20.3 cm
Peak gradient (98% linearity)	4.1 T/m	12.5 T/m
Integrated gradient	0.048 T/A	0.110 T/A

10.2 cm

The bunch compressor

- Now modelled as a series of four hard edge dipoles in ELEGANT
- Right now elaborating a better model tat include fringe field using Enge function model

$$B_y(0, 0, z)/B_{y0} = \frac{1}{1 + \exp(c_1 + c_2s + c_3s^2 + c_4s^3 + c_5s^4 + c_6s^5 + c_7s^6 + c_8s^7)}$$



Example of A0

inner

outer

measured

extrapolated

